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by the average negro is apt to make him care little for the things of this world, and is thus a drawback to him, while Lindley M. Keasbey intimates, in 'The Descent of Man,' that his physical inferiority to beasts of prey acted as a stimulus to his brain.

The Osprey for January begins a new series in a new garb, with new type. It contains 'The California Jay,' by D. A. Cohen; 'Random and Reminiscent Maine Bird Notes,' by W. C. Kendall; 'August Birds of Stony Man Mountain, Virginia,' by William Palmer; and a review of the 'Life and Ornithological Labors of Sir John Richardson,' by Theodore Gill. A review of 'Animals of the Past' includes reproductions of the restorations of *Phorochacos*, *Archæopteryx* and *Hesperornis*. Also, in the form of a supplement we have the first part of a 'General History of Birds,' starting with an interesting history of the etymology of bird.

The Museums Journal of Great Britain, for January, under the title 'The Man as Museum-Curator,' has an appreciative notice of Dr. G. Brown Goode in a review by F. A. Bather of the memorial volume published by the Smithsonian Institution. There is also a good article, 'On the Arrangement of Mineralogical Collections,' by J. G. Goodchild, and notes on 'New Zealand Museums' and 'Oxford Museums,' besides a long list of General Notes, which as a rule constitute a most, if not the most, interesting portion of scientific periodicals.

SOCIETIES AND ACADEMIES.

THE CHICAGO SECTION OF THE AMERICAN MATHEMATICAL SOCIETY.

THE tenth regular meeting of the Section was held at Northwestern University, Evanston, Illinois, on January 2 and 3, 1902. Four sessions were devoted to the reading and discussion of the following papers:

- (1) Professor M. W. HASKELL: 'A fundamental theorem in the geometry of the tetrahedron.'
- (2) Professor M. W. HASKELL: 'A theorem for the twisted cubic analogous to Pascal's theorem.'
- (3) Professor M. W. HASKELL: 'A special cubic transformation in space.'

(4) Professor H. S. WHITE: 'Note on a twisted curve connected with an involution of pairs of points in a plane.'

(5) Dr. J. W. GLOVER: 'On the derivation of the asymptotes of an algebraic curve from the definition' (preliminary communication).

(6) Professor ARNOLD EMCH: 'Algebraic transformations of a complex variable realized by linkages.'

(7) Professor L. W. DOWLING: 'On the conformal representation of the isosceles triangle containing an angle of 120 degrees.'

(8) Professor E. H. MOORE: 'On Hilbert's plane desarguesian geometry.'

(9) Dr. F. R. MOULTON: 'A simple non-desarguesian geometry.'

(10) Dr. JACOB WESTLUND: 'Note on multiplying perfect numbers.'

(11) Dr. JACOB WESTLUND: 'On the class number of a particular cyclotomic number-field.'

(12) Dr. CHARLES L. BOUTON: 'The equivalence of linear differential equations for a transformation of the independent variable.'

(13) Dr. T. P. HALL: 'An algebra of space.'

(14) Professor J. B. SHAW: 'Commutivity of matrices and application to the theory of linear associative algebra.'

(15) Dr. H. G. KEPPEL: 'A cubic three-way locus in four-fold space.'

(16) Dr. J. C. FIELDS: 'An equivalent of Plücker's formulæ.'

(17) Professor H. B. NEWSON: 'On the product of linear substitutions.'

(18) Professor G. A. MILLER: 'On the groups of order p^m which contain operators of order p^{m-2} .'

(19) Professor L. E. DICKSON: 'Some simplifications in the theory of linear groups.'

A topic of a more distinctly pedagogical character was introduced by Professor Townsend, namely, the question of uniformity in the requirements for the Master's degree where mathematics is the major subject, and the allied question of equivalent credits for students migrating from one institution to another. After some discussion the matter was referred to a committee for report at the next meeting of the Section. An enjoyable feature of the meeting was the dinner served in one of the University buildings to the members present, and followed by an exhibition by Dr. Keppel of about fifty portraits of eminent mathematicians.

At the business session the secretary was re-elected for the ensuing year and associated with him on the program committee were Professors Townsend and Dowling.

THOMAS F. HOLGATE,
Secretary of the Section.

THE TORREY BOTANICAL CLUB.

At the annual meeting of the Club, held on January 14, the Secretary reported 15 meetings held with an attendance averaging 20; 28 active members elected, total present active membership 238. Alternate meetings have been held at the Botanical Garden at Bronx Park and at the College of Pharmacy. The number of scientific papers has been 26, besides about 34 informal notes.

The editor in chief, Professor Underwood, reported issue of the largest volume of the *Bulletin* in its history, 706 pages and 48 plates. It is the intention to make the *Bulletin* a necessity to botanists the world over. The monthly index of recent literature has been reprinted as usual in card form and includes 983 titles for 1901, an increase of 127. Volume 10 of the *Memoirs*, including the first part of E. S. Burgess' 'Aster Studies' is nearly through the press. No. 1 of Vol. 11, Mr. Griffiths' memoir on North American Sordariaceæ, has been printed. The principle adopted with the issue of Vol. 7 to make the memoirs pay for their own publication has been eminently successful. An increased sale of recent volumes and of sets was reported. The following forthcoming publications were announced: In Vol. 8, the conclusion of Professor Lloyd's studies on the embryology of the Rubiaceæ; by Dr. A. W. Evans, 'A Monograph of the Lejeuneæ of the United States and Canada'; by Mrs. E. G. Britton and Miss Alexandrina Taylor, 'The Life History of *Vittaria lineata*'; in Vol. 11, 'The Ulothricaceæ and Chaetophoraceæ of the United States,' by Mr. T. B. Hazen; Vol. 12, the second part of E. S. Burgess' 'Aster Studies.'

Dr. M. A. Howe, the editor, reported an encouraging first year for *Torreya*, the monthly started by the club with January, 1901, for

briefier notes and botanical matter of a more popular nature.

Dr. J. K. Small reported on the recent installation of the club's herbarium at the Botanical Garden, where it is now to form the nucleus of a representative local collection to cover the flora of New York and vicinity within the 100-mile limit.

The annual election followed, the officers elected including Hon. Addison Brown, *President*; Dr. T. F. Allen and Dr. H. H. Rusby, *Vice-Presidents*; Professor F. E. Lloyd, *Treasurer*; Edward S. Burgess, *Recording Secretary*; Dr. L. M. Underwood, *Editor of the Bulletin*; Dr. M. A. Howe, *Editor of Torreya*.

E. S. BURGESS,
Secretary.

GEOLOGICAL SOCIETY OF WASHINGTON.

THE 123d meeting was held January 22. The first paper, 'The Development of Septa in Paleozoic Corals,' by Dr. J. E. Duerden, gave an account of some of his recent results on the mesenterial and septal development of modern and fossil corals. After referring to the difference in this respect between *Porites* and *Madrepora* as compared with most other recent corals, the author proceeded to show how closely the septal development in the Palæozoic Rugose corals conforms with the mesenterial sequence in living Zoanthid polyps. Serial sections of the Carboniferous *Lophophyllum proliferum* (McChesney) demonstrate that the primary stage in the growth of this coral is six-rayed, and that in the subsequent development new septa are added successively within only four of the six primary interseptal chambers. The relationships can also be confirmed by means of the external ridges and grooves on the corallum.

The facts prove that while in their primary stage the Rugosa are hexameral, yet they can not be brought into close relationship with modern corals, but are undoubtedly allied to the Zoanthids which flourish to-day mainly in tropical seas. In the past the Zoanthids probably bore much the same relationship to the Rugose corals which living Actinians hold to recent corals.

The second paper, entitled 'The Mesabi Iron Range,' was presented by Mr. C. K. Leith.

Mr. Leith discussed certain new developments in the geology of the Mesabi iron range of Minnesota. He showed that the Keewatin series of the Minnesota Survey comprises two distinct series—an igneous 'basement complex' and a sedimentary series. The former is classed as Archean and the latter as Lower Huronian by the United States Geological Survey. The district therefore shows a complete succession from the Archean through the Lower Huronian into the Keewenawan, and in the fullness of the succession and in the clear-cut unconformities the Mesabi may be regarded as the type of Pre-Cambrian district of the Lake Superior region.

The iron ores result from the alteration of certain peculiar rocks composed of aggregates of minute green granules. The granules were called *glaucinite* by Spurr, and were supposed to be of organic origin. The present investigation, however, shows them not to be glauconite. They are composed essentially of ferrous iron and silica, and lack potash, a constituent essential to glauconite. The granules, it is believed, were developed in much the same manner as the iron carbonates, which are the original iron-bearing rocks of the older iron districts. The iron (derived from the disintegration of older basic rocks) was carried in a ferrous form into the ocean, which was depositing iron formation material, and was there precipitated as hematite or limonite, and at the bottom of the ocean was again reduced by organic matter to a ferrous form, and then combined with silica, giving the substance we now find. The occurrence of the substance in granules is due to the same causes as the oolitic structure in limestone. After the iron formation, thus formed, emerged from the sea, weathering and the concentration of the ore began. The ferrous silicate was broken up and the iron oxidized. As the work was done through the agency of percolating underground waters, the position of the ore deposits was determined by the laws of flowage of such waters. The deposits are now found in gently pitching troughs formed by the gentle folding of the iron formations and bottomed by slaty layers,

or their altered equivalents, the paint rock, in the iron formation.

Dr. Whitman Cross then made some comments on an article by Mr. Bailey Willis dealing with stratigraphic classification. Dr. Cross expressed the belief that a geologic map should express as much of geologic development as practicable; that a map whose cartographic units were discriminated solely on the lithologic characters of the so-called 'lithologic individuals' was not entitled to be called a geologic map. It was really a lithologic map. He contended that in order to express geologic development the units of cartography must be established with due regard to all classes of available facts, and that restrictions were both undesirable and unnecessary.

ALFRED H. BROOKS,
Secretary.

DISCUSSION AND CORRESPONDENCE.

THE ENDOWMENT OF RESEARCH.

TO THE EDITOR OF SCIENCE: IN SCIENCE OF February 8, 1901, N. S., Vol. XIII., p. 201, there is an article by Professor E. C. Pickering remarking on and requesting suggestions in regard to the reasons why there is so little demand for grants from various funds which are available for research. I had hoped that some one with wide experience would have some suggestions to offer on this subject. But since no one, so far as I am aware, has published a reply, I am moved to offer a few thoughts of my own. I feel inclined to do so at this time because Mr. Carnegie has just endowed research on a magnificent scale, and, as some of the difficulties which have confronted Professor Pickering will doubtless confront the trustees of this fund, a discussion of the matter seems particularly desirable.

The lack of requests for research funds is not because there is lack of desire to do research work. There are plenty of students eager to investigate questions in which they are interested. More than a dozen have mentioned such a desire to me within the last ten years. Two or three of these were Harvard or Technology graduates, amply prepared by training to carry on such researches. I have